



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 0 717 828 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**12.07.2000 Bulletin 2000/28**

(21) Application number: **94927889.9**

(22) Date of filing: **08.09.1994**

(51) Int. Cl.<sup>7</sup>: **F24F 13/24, F24F 13/28**

(86) International application number:  
**PCT/SE94/00833**

(87) International publication number:  
**WO 95/08084 (23.03.1995 Gazette 1995/13)**

(54) **VENTILATION ARRANGEMENT, INCLUDING FILTER CONSTRUCTED AS SOUND DAMPENER,  
FLOW DAMPER AND FOR FILTERING PURPOSES**

**LÜFTUNGSANORDNUNG MIT EINEM FILTER ZUR VERWENDUNG ALS SCHALLDÄMPFER,  
DURCHFLUSSREGLER UND FILTER**

**AGENCEMENT DE VENTILATION A FILTRE AMORTISSEUR ACOUSTIQUE, AMORTISSEUR DE  
FLUX DESTINE AU FILTRAGE**

(84) Designated Contracting States:  
**AT BE DE DK ES FR GB IT LU NL PT SE**

(30) Priority: **15.09.1993 SE 9303002**

(43) Date of publication of application:  
**26.06.1996 Bulletin 1996/26**

(73) Proprietor:  
**P.O. ANDERSSON KONSTRUKTIONSBYRA AB  
171 28 Solna (SE)**

(72) Inventor: **ANDERSSON, Per, Otto  
S-161 55 Bromma (SE)**

(74) Representative:  
**Nilsson, Karl Ingvar et al  
STENHAGEN PATENTBYRA AB  
P.O. Box 4630  
116 91 Stockholm (SE)**

(56) References cited:  

<b>EP-A- 0 466 669</b>	<b>WO-A-91/14138</b>
<b>SE-B- 434 466</b>	<b>SE-B- 435 101</b>
<b>SE-B- 444 852</b>	<b>SE-B- 451 111</b>
<b>US-A- 4 150 696</b>	<b>US-A- 5 313 803</b>

Remarks:

The file contains technical information submitted  
after the application was filed and not included in  
this specification

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

**EP 0 717 828 B1**

## Description

[0001] The present invention relates to a ventilation plant according to the preamble of claim 1.

[0002] Plants of this type usually are provided with filter boxes positioned in the ducts and containing laterally replaceable filter units. Measures are taken there that the filters are causing as low pressure drops as possible in order not to load the fans unnecessarily. Therefore, the filter units have a complicated design with a large area in spite of a limited space resulting in difficulties in connection with sealing meters which have a tendency to by-pass air unfiltered. The boxes are also space consuming. Moreover, throttling devices in the shape of adjustable valves in the ducts are necessary. The mounting of these and the adjusting of them to proper balancing of the air flows in the ducts is a considerable complication and a time consuming work.

[0003] A central air conditioning unit is disclosed by the US-A-5 313 803, in which filter devices are provided along the ducts or at the air outlet openings into a room to be air conditioned. The filter devices are constructed and arranged to form a sound-barrier, i.e. a sound-damping or sound-blocking system, and for that reason generate in the region ahead of the filter devices a predetermined static pressure, and the filter devices are designed to provide a pressure drop of at least 50% and at most 80% of the predetermined static pressure. Conventional flow control elements are provided for obtaining a balanced flow of air in the ducts, the adjustment of which is a considerable complication.

[0004] The object of the invention is to achieve a ventilation plant of the kind initially mentioned in which the drawbacks mentioned above are eliminated, and which is specially suited for systems with extremely heavy demands for purity and functioning, and, as a consequence, simple and sufficient inspection possibilities, as for example in laboratory buildings and animal-occupied spaces.

[0005] This has been achieved, according to the invention, in that the plant has obtained the characterizing features defined in claim 1.

[0006] A solution of the problems as to the balancing of the air flows and the damping of the usually strong noise occurring when the air flows through the throttling devices in conventional plants has been achieved by the invention by a simple measure, which is completely against accepted or standard rules, viz. installation of filters having an interior or a built-in pressure drop of a magnitude making the installation of conventional throttling devices and accordingly also conventional sound-damping devices superfluous. It has turned out, that the air flows noiseless through the filters. Because the filters are positioned in the spacings at the openings for intake air and exhaust air, and specific throttling devices and sound damping devices are eliminated, the interior of duct system becomes free from pollution as well as devices disturbing the air flow. Moreover, differ-

ent spacings become separated from each other by the filters such that for instance disease carrying particles are prevented from being spread between different spacings, because normally the filters are of such a grade that disease carrying particles cannot penetrate the filters. The filters also act as sound-damping means between different spacings. The placing of the filters simplifies the important changing of the filters, which can be made out of fire-resistive material that can resist high temperatures without being destroyed, at least under the temperature circumstances existing in connection with release of a sprinkler system in case of fire.

[0007] The invention will become more readily apparent from the following description, reference being made to the accompanying drawing showing a simplified diagram of a ventilation plant in a building.

[0008] The drawing discloses a building 1 with a number of room spaces 2. A straight duct 4 for intake air is suspended from the ceiling of a corridor 3 and connected to a fan 5 provided with a conventional filter 6. In parallel to the duct 4 there is a duct 7 for exhaust air connected to a fan 8.

[0009] A branch duct 9 from the duct 4 for intake air communicates each with a room spacing, which branch ducts are terminated each by an opening 10 to which a tubular filter 11 provided with a closed end 12 is sealingly attached. A branch duct 19 from the duct 7 for exhaust air communicates each with a room spacing, which branch ducts are terminated with a section 19' having a slightly larger area than the branch duct 19 and an opening 20 to which a tubular filter 21 is sealingly attached, which is slightly narrowing towards a closed end 22. The filter 21 extends into the section 19' along mainly its entire length and is protected by it. The filters 11, on the other hand, are positioned in the open air, which is possible because they are stiff enough and the contamination occurs inside the filters. If desired, however, a casing may be attached outside the filters as an extension of the branch ducts 9 and having a slightly larger area than the branch ducts 9.

[0010] Filter devices 11 and 21 are a type of tubular filter bags which have an interior or built-in pressure drop of about 200 Pascal, and which are designed to prevent penetration of the smallest particles. Filter devices having a slightly larger or smaller pressure drop can be utilized for achieving the proper balance. The filter devices are easily mounted. The open end is attached to the end portion of a branch duct 9 or a section 19', in which latter case the filter 21 is pushed into the interior of the section 19'.

[0011] The invention is of course not limited to the embodiment shown and described above, but can be modified in different ways within the scope of the inventive idea defined by the claim.

## Claims

1. A ventilation plant comprising fans (5,8) for distribu-

tion in branch ducts (9,19) of intake air to separate room spaces (2) and exhaust air from the separate room spaces (2) and provided with means for balancing the air flows through the branch ducts by throttling means associated with the ducts, characterized that the outlet openings (10) for the intake air and inlet opening (20) for the exhaust air in all the separate room spaces (2) are all provided with easily replaceable tubular filter bags (11,21) having built-in pressure drops for creating all the pressure drops necessary for acting as the throttling means of the branch ducts (9) of intake air and the branch ducts (19) of the exhaust air of the plant, the thick-walled filter bags also acting as the sound damping device of the plant.

d'échappement de l'installation, les sacs filtrants à paroi épaisse agissant également comme dispositif d'amortissement acoustique de l'installation.

### Patentansprüche

1. Lüftungseinrichtung enthaltend Ventilatoren (5, 8) zur Verteilung von Zugangsluft zu verschiedenen Räumen (2) und Abgangsluft von diesen verschiedenen Räumen (2) in Abzweigkanälen (9, 19) und Mittel zum Ausgleich der Luftströme durch die Abzweigkanäle durch Drosselmittel, welche den Kanälen zugeordnet sind, dadurch gekennzeichnet, daß die Auslaßöffnungen (10) für die Zugangs- luft und die Einlaßöffnung (20) für die Abgangsluft in allen separaten Räumen (2) mit leicht austausch- baren rohrförmigen Filtertaschen (11, 21) versehen sind, welche eingebaute Druckabfälle haben, um alle die Druckabfälle zu erzeugen, welche notwen- dig sind, um als Drosselmittel der Abzweigkanäle (9) der Zugangsluft und der Abzweigkanäle (19) der Abgangsluft der Einrichtung zu wirken, wobei die dickwandigen Filtertaschen auch als die zweite Dämpfungsvorrichtung der Einrichtung wirken.

### Revendications

1. Une installation de ventilation comprenant des ven- tilateurs (5, 8) pour effectuer une distribution dans des conduits de ramification (9, 19) d'air d'admis- sion, vers des espaces de locaux (2) séparés et de l'air d'échappement issu des espaces de locaux (2) séparés et équipée de moyens pour équilibrer les flux d'air passant par les conduits de ramification, à l'aide de moyens d'étranglement associés aux con- duits, caractérisée en ce que les ouvertures de sor- tie (10) destinées à l'air d'admission et l'ouverture d'entrée (20) destinée à l'air d'échappement dans tous les espaces de locaux (2) séparés sont toutes pourvues de sacs filtrants (11, 21) tubulaires aisé- ment remplaçables, provoquant des pertes de charge intrinsèques afin de créer la totalité des per- tes de charge nécessaires pour agir comme moyens d'étranglement des conduits de ramifica- tion (9) de l'air d'admission et des conduits de rami- fication ou de branchement (19) de l'air

